

FEU03 – SOP for Firearm Barrel and Overall Length Measurements

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1. Scope

- 1.1. This standard operating procedure is designed to provide a technique for the measurements of barrels and the overall length of a firearm in the Firearms Examination Section when requested by a contributor or is probative to the case.

2. Background

- 2.1. To establish the practices for documenting the examination of firearm evidence to conform to the requirements of the Department of Forensic Sciences (DFS) Forensic Science Laboratory (FSL) *Quality Assurance Manual*, the accreditation standards under ISO/IEC 17025:2005, and any supplemental standards.

3. Safety

- 3.1. For proper handling of firearm see the *FEU01 - SOP for the Safe Handling of Firearms*.

4. Materials Required

- 4.1. National Institute of Standards and Technology (NIST) traceable steel rulers, dowel rods and T-Square.

5. Standards and Controls

- 5.1. A National Institute of Standards and Technology (NIST) traceable ruler will be used for barrel measurements and overall firearm length measurements.

6. Calibration

- 6.1. Not applicable

7. Procedures

7.1. Barrel Measurements

- 7.1.1. Safe Handling of Firearms standard operating procedures are to be followed when handling all firearms.
- 7.1.2. Revolver barrels are measured using a steel NIST certified ruler placed next to the barrel.
- 7.1.3. Measure from the rear end of the barrel just forward of the cylinder toward the muzzle.
- 7.1.4. Barrels on other firearms are measured with the action closed using a steel ruler and dowel rod. The firing pin must be cocked to ensure it does not protrude through the breech face preventing the dowel rod from making contact with the breech.
- 7.1.5. Insert a dowel rod in the barrel until it reaches the breech face. Mark the spot on the dowel rod where the barrel ends. Measure the length between the mark and the end of the dowel rod using a NIST certified ruler.
- 7.1.6. When a barrel length measurement is requested or is probative to a case, a NIST standard ruler (or steel ruler which has been performance checked against a NIST standard ruler) will be used. The serial number for the NIST standard ruler used for the measurement or the performance check will be recorded in the examination notes.

7.2. Overall Length Measurements

- 7.2.1. Measure the overall length of a firearm from a line which is parallel to the axis of the bore from a perpendicular tangential line which touches the rearmost point of the butt-plate to the muzzle. With the firearm positioned in the measuring platform, a square is placed at a right angle on the T-Square touching the muzzle to determine the overall length measurement.

7.2.2. When the overall length of a firearm measurement is requested or is probative to a case, a T-Square which has been performance checked against a NIST standard ruler will be used. The serial number for the NIST standard ruler used for the performance check will be recorded in the examination notes.

7.2.3. When measuring a shortened or altered firearm the barrel or the overall length, the measurement shall be from the furthest point.

8. Sampling

8.1. Not applicable

9. Calculations

9.1. Not applicable

10. Uncertainty of Measurement

10.1. When quantitative results are obtained, and the significance of the value may impact the report, the uncertainty of measurement must be determined. The method used to determine the estimation of uncertainty can be found in the *FSL Quality Assurance Manual – Estimation of Uncertainty of Measurement (Section 5.4.6)* and in the **FEU Appendix A, Uncertainty of Measurement Guidelines.**

11. Limitations

11.1. Barrel length measurements are dependent on the straightness of the dowel rod and the assessment of the muzzle end in relation to the dowel rod. Overall length measurements are dependent on proper alignment in the measuring platform.

12. Documentation

12.1. FEU Examination Worksheets

12.2. FEU Report

13. References

- 13.1. ASCLD/LAB International, Estimating Uncertainty of Measurement Policy, (July 2012)
- 13.2. DC Criminal Code: citation definitions 7-2501.01; 7-2551.01; 38-234 (2011)
- 13.3. *FSL Health and Safety Manual* (Current Version)
- 13.4. *Forensic Science Laboratory Quality Assurance Manual* (Current Version)
- 13.5. *FSL Departmental Operations Manuals* (Current Versions)
- 13.6. *FSL Laboratory Operations Manuals* (Current Versions)
- 13.7. *FEU01 - SOP for Safe Handling of Firearms* (Current version)